

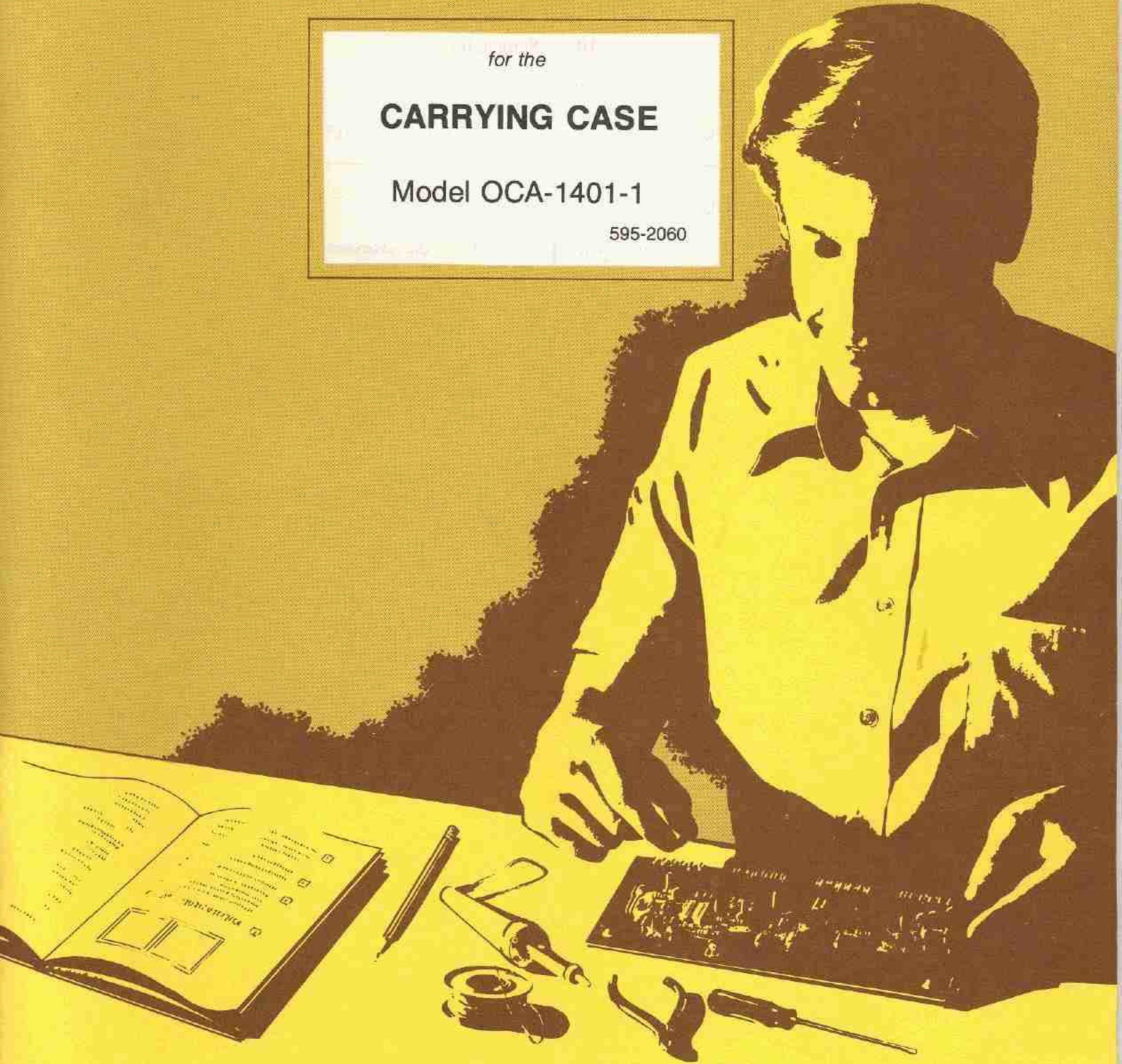
HEATHKIT® MANUAL

for the

CARRYING CASE

Model OCA-1401-1

595-2060



HEATH COMPANY • BENTON HARBOR, MICHIGAN

HEATH COMPANY PHONE DIRECTORY

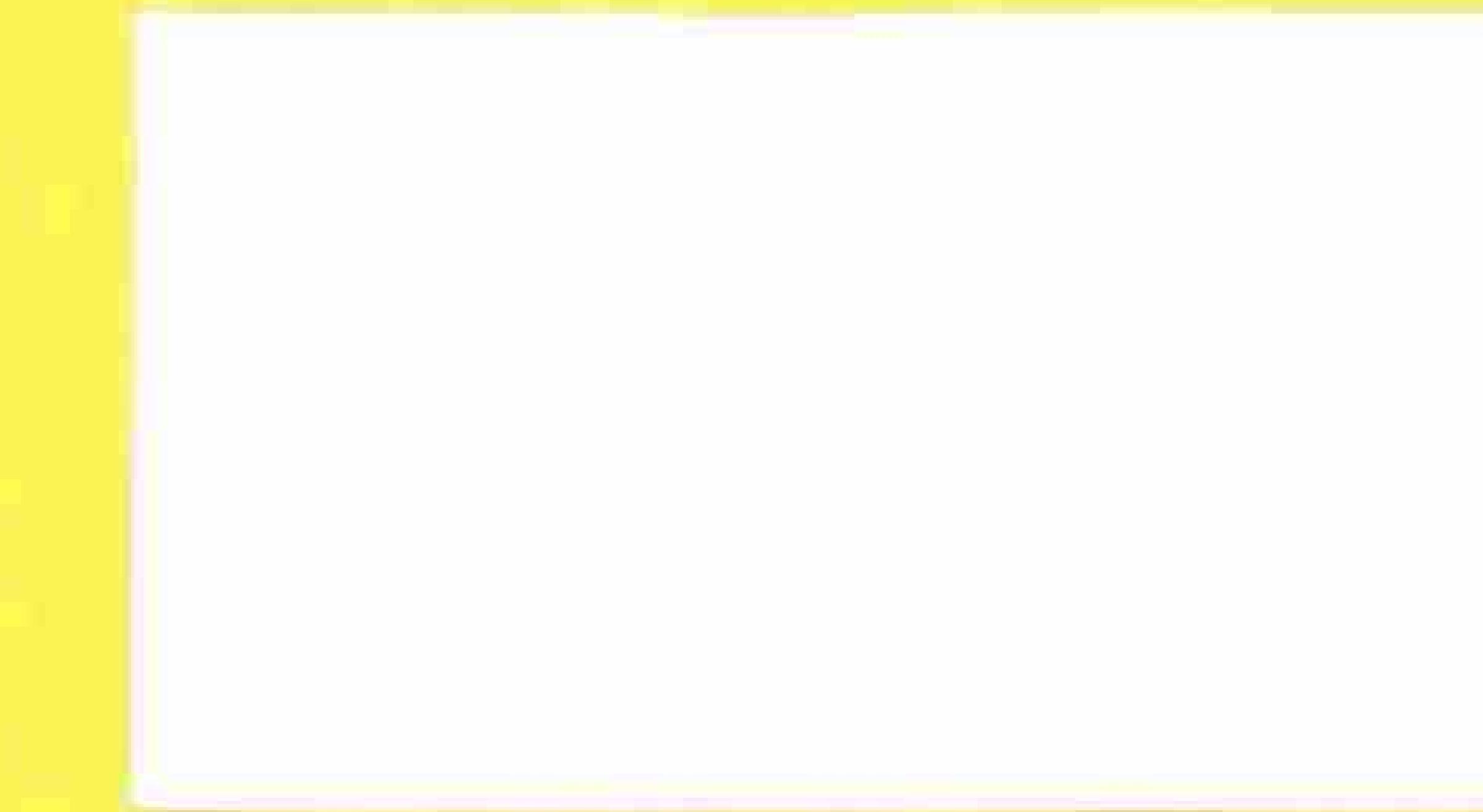
The following telephone numbers are direct lines to the departments listed:

Kit orders and delivery information	(616) 982-3411
Credit	(616) 982-3561
Replacement Parts	(616) 982-3571

Technical Assistance Phone Numbers

8:00 A.M. to 12 P.M. and 1:00 P.M. to 4:30 P.M., EST, Weekdays Only

R.C. Audio, and Electronic Organs	(616) 982-3310
Amateur Radio	(616) 982-3296
Test Equipment, Weather Instruments and Home Clocks	(616) 982-3315
Television	(616) 982-3307
Aircraft, Manne, Security, Scanners, Automotive, Appliances and General Products	(616) 982-3496
Computers	(616) 982-3309



YOUR HEATHKIT 90 DAY LIMITED WARRANTY

If you are not satisfied with our service - warranty or otherwise - or with our products, write directly to our Director of Customer Services, Heath Company, Benton Harbor, Michigan 49022. He will make certain your problems receive immediate, personal attention.

Our attorney, who happens to be quite a kitbuilder himself, insists that we describe our warranty using all the necessary legal phrases in order to comply with the new warranty regulations. Fine. Here they are:

For a period of ninety (90) days after purchase, Heath Company will replace or repair free of charge any parts that are defective either in materials or workmanship. You can obtain parts directly from Heath Company by writing us at the address below or by telephoning us at (616) 982-3571. And we'll pay shipping charges to get those parts to you — anywhere in the world.

We warrant that during the first ninety (90) days after purchase, our products, when correctly assembled, calibrated, adjusted and used in accordance with our printed instructions, will meet published specifications.

If a defective part or error in design has caused your Heathkit product to malfunction during the warranty period through no fault of yours, we will service it free upon proof of purchase and delivery at your expense to the Heath factory, any Heathkit Electronic Center (units of Schlumberger Products Corporation), or any of our authorized overseas distributors.

You will receive free consultation on any problem you might encounter in the assembly or use of your Heathkit product. Just drop us a line or give us a call. Sorry, we cannot accept collect calls.

Our warranty does not cover and we are not responsible for damage caused by the use of corrosive solder, defective tools, incorrect assembly, misuse, fire, or by unauthorized modifications to or uses of our products for purposes other than as advertised. Our warranty does not include reimbursement for customer assembly or set-up time.

This warranty covers only Heathkit products and is not extended to allied equipment or components used in conjunction with our products. **We are not responsible for incidental or consequential damages.** Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

HEATH COMPANY
BENTON HARBOR, MI. 49022

Prices and specifications subject to change without notice.

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for the

CARRYING CASE

Model OCA-1401-1

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HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

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INTRODUCTION

The Heathkit Model OCA-1401-1 Carrying Case is the perfect companion for your OC-1401 Aircraft Navigation Computer. It has the following features:

- Provides an in-flight power source that is independent of the aircraft's electrical system.
- Allows you to conveniently carry your Computer and all its accessories.
- Its distinctive color identifies you as the owner of a very unique, general aviation pilot aid.
- Provides a built-in power supply/battery charger that frees your other chargers for use at other locations.



PARTS LIST

Unpack the kit and check each part against the following list. The key numbers correspond to the numbers on the "Parts Pictorial" (Illustration Booklet, Page 1). Return any part that is packed in an individual envelope, with the part number on it, to its envelope after you identify it until that part is called for in a step.

To order a replacement part, always include the PART NUMBER. Use the Parts Order Form furnished with this kit. If one is not available, see "Replacement Parts" inside the rear cover of your Manual. For prices, refer to the separate "Heath Parts Price List."

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
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CIRCUIT Comp. No.

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
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CIRCUIT Comp. No.

ELECTRICAL PARTS

A1	JK1-120-12	1	120 Ω (brown-red-brown) 1/4-watt, 5% resistor	R1
A2	JK3-53-5	1	20 Ω, 5-watt, 5% resistor	R2
A3	JK57-65	4	1N4002 diode	D1, D2, D3, D4
A4	JK412-611	1	LED (light-emitting-diode)	LED 1
A5	JK418-29	4	Nickel-cadmium battery ("C" cell)	
A6	JK54-951	1	Transformer	T1

HARDWARE

NOTE: The hardware may be in more than one packet. Open all the hardware packets according to their size before you check the hardware.

Hardware is shown actual size. To identify a piece of hardware, place it over the illustration.

JK#4 Hardware

B1	250-391	6	4-40 × 5/16" black screw
B2	252-2	6	4-40 nut
B3	254-9	6	#4 lockwasher

MISCELLANEOUS

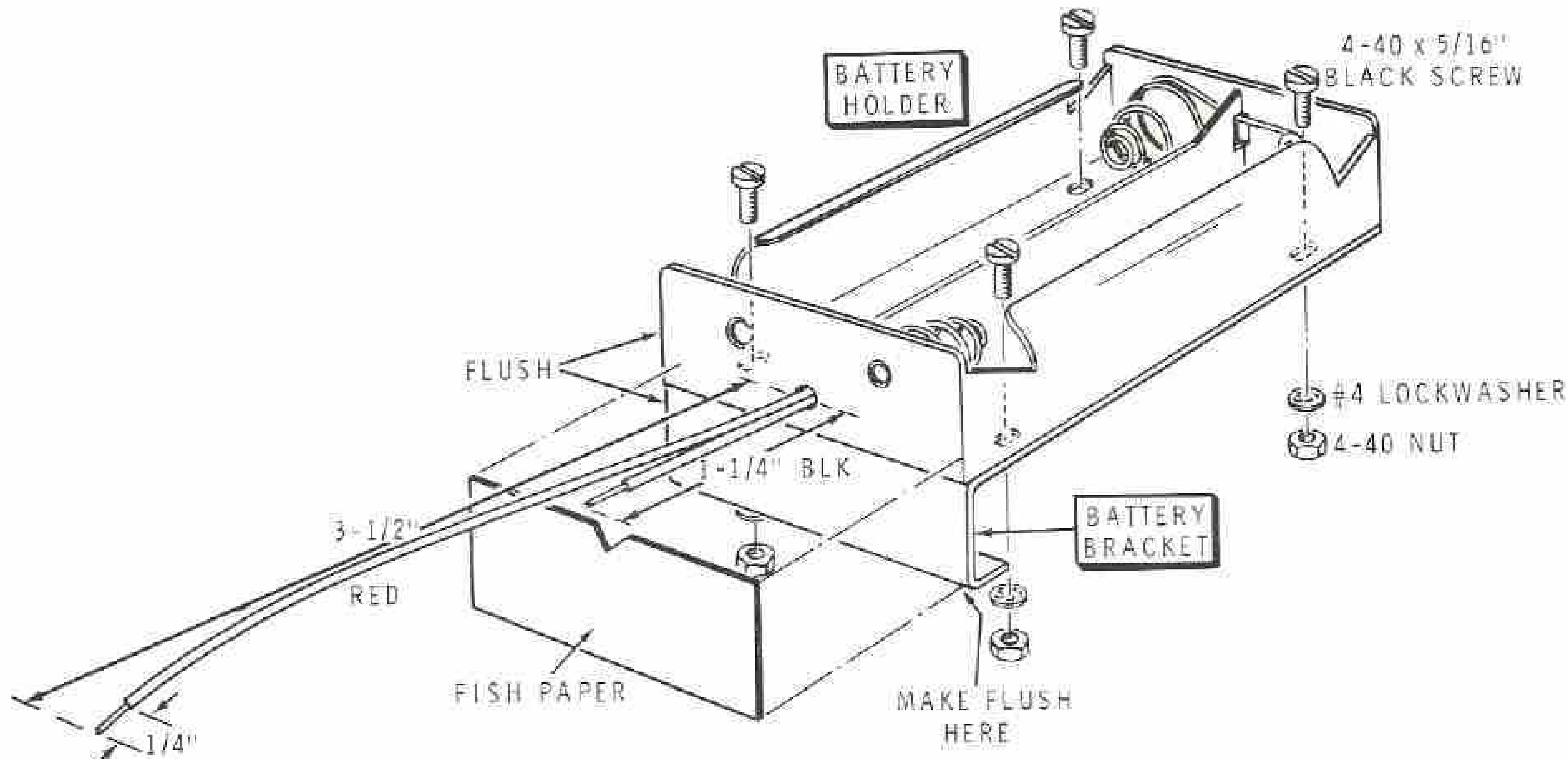
D1	JK73-156	2'	Foam Tape
D2	JK75-24	1	Small strain relief
D3	JK75-71	1	Large strain relief
D4	JK75-738	1	Fish paper
D5	JK89-23	1	Line cord
D6	JK89-59	60"	DC cable
	JK346-4	8"	Sleeving
	JK95-633	1	Carrying case
E1	JK204-2307	1	Battery bracket
E2	JK205-1746-1	1	Cover plate
E3	JK205-1755-1	1	Divider plate
E4	JK214-219	1	Battery holder
E5	JK260-89	1	Grommet
E6	JK260-90	1	Retaining ring
E7	JK354-9	2	Cable holder
E8	JK431-5	1	4-lug terminal strip
E9	JK431-43	1	3-lug terminal strip
E10	JK490-5	1	Nut starter
	597-260	1	Parts Order Form
E11	390-1414	1	Label set
	391-34	1	Blue and white label
		1	Assembly Manual (See front cover for part number.)

Solder

JK#6 Hardware

C1	250-381	5	6-32 × 3/8" black screw
C2	250-155	4	#6 × 3/8" black sheet metal screw
C3	252-3	3	6-32 nut
C4	254-1	4	#6 lockwasher
C5	259-1	1	#6 solder lug
C6	266-929	2	Plastic nut

STEP-BY-STEP ASSEMBLY



PICTORIAL 1

Refer to Pictorial 1 for the following steps.

NOTE: Use the plastic nut starter supplied with this kit to hold and start 6-32 and 4-40 nuts on screws.

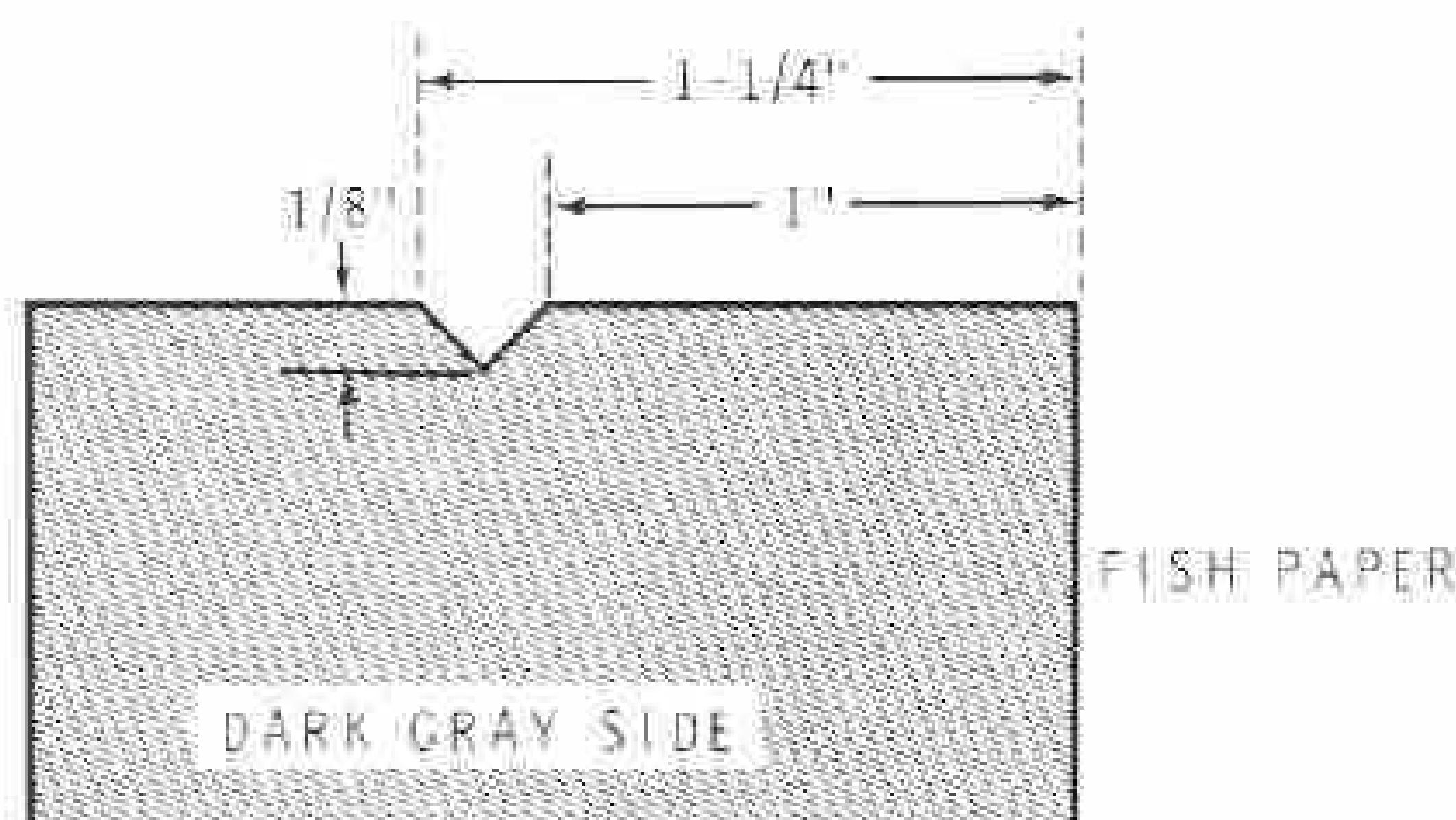
- (X) Mount the battery holder to the battery bracket so the ends are flush as shown. Be sure the wires are positioned as shown. Use four 4-40 × 5/16" black screws, four #4 lockwashers, and four 4-40 nuts.
- (X) Refer to Detail 1A and cut a notch in the fish paper as shown. Then remove the protective paper backing and apply the fish paper to the assembly. Be sure the indicated edge of the fish paper is flush with the edge of the bracket as shown.

NOTE: When you prepare a wire end, as in the next step, twist together the bare strands and melt a small amount of solder on the wire end to hold the strands together.

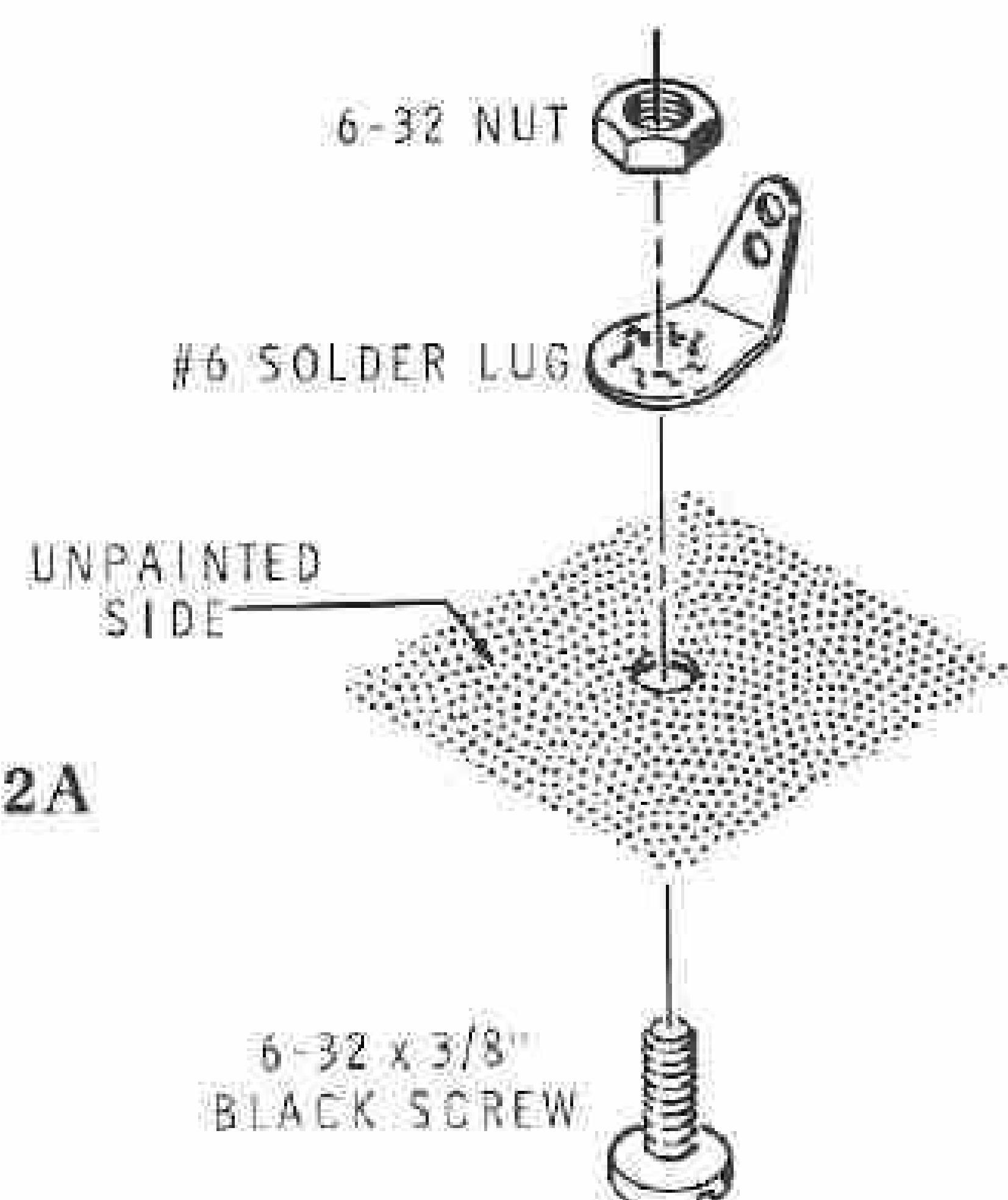
(X) Cut the red wire to 3-1/2" as shown, and remove 1/4" of insulation from the wire end.

(X) Cut the black wire to 1-1/4" and remove 1/4" of insulation from the wire end.

(X) Set the assembly aside temporarily.



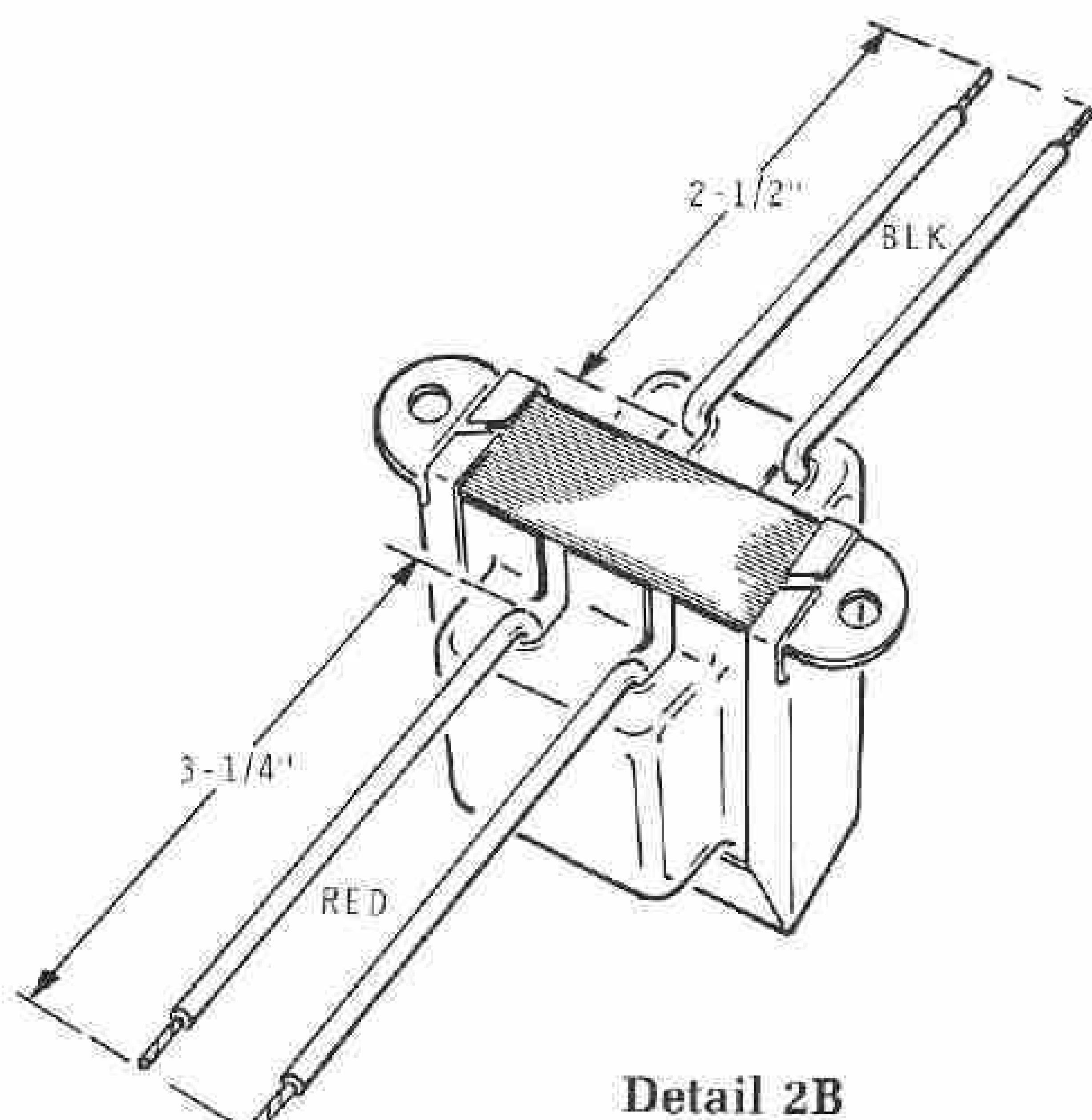
Detail 1A



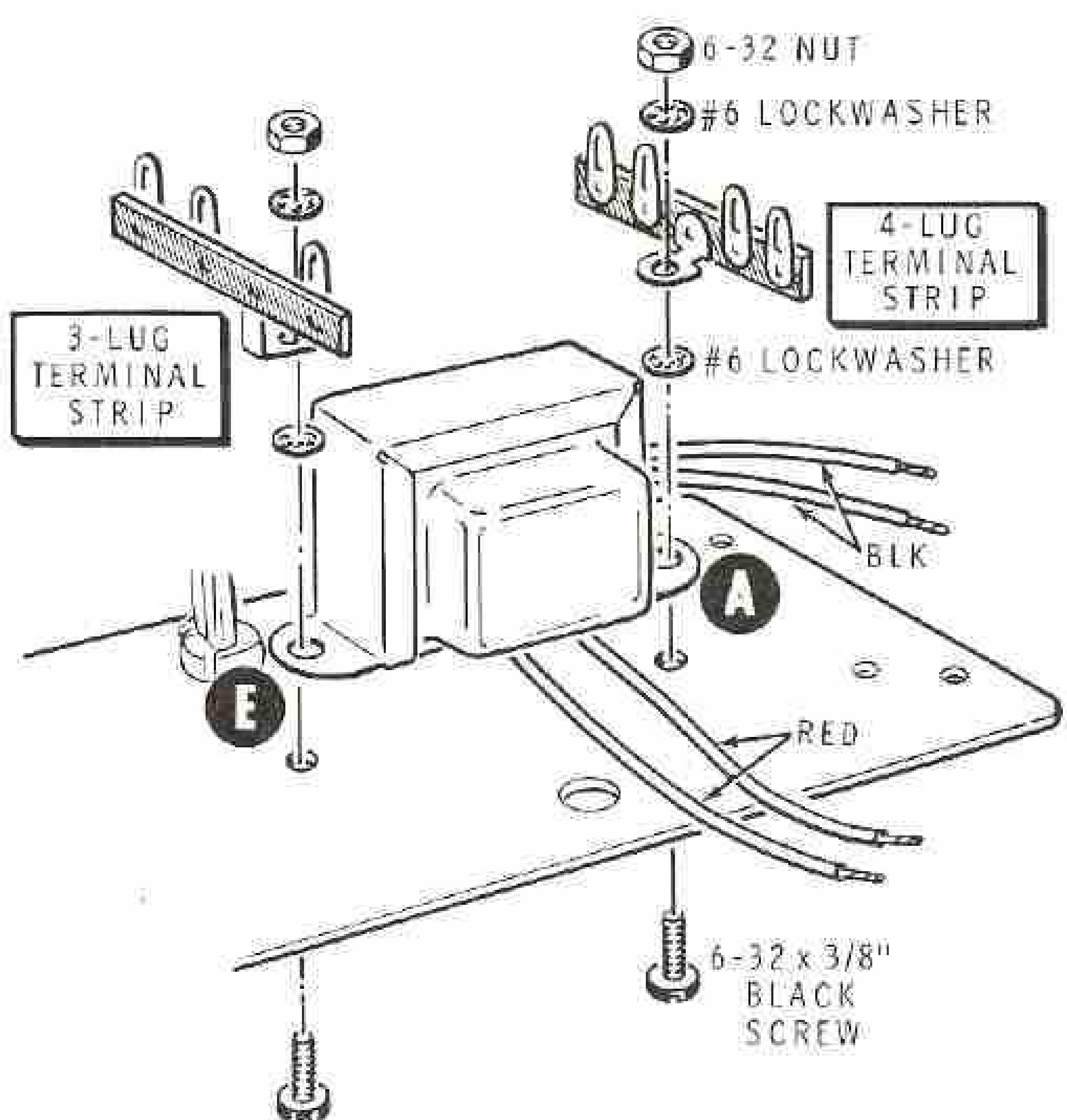
Detail 2A

Refer to Pictorial 2 (Illustration Booklet, Page 2) for the following steps.

- (X) Refer to Detail 2A and mount a #6 solder lug to the cover plate at C. Use a 6-32 × 3/8" black screw and a 6-32 nut. Position the solder lug as shown.
- (X) Refer to Detail 2B and prepare the transformer leads as shown. Measure them from where they come out of the transformer. Remove 1/4" of insulation from the lead ends.

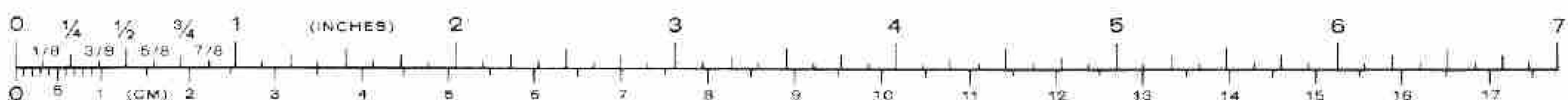


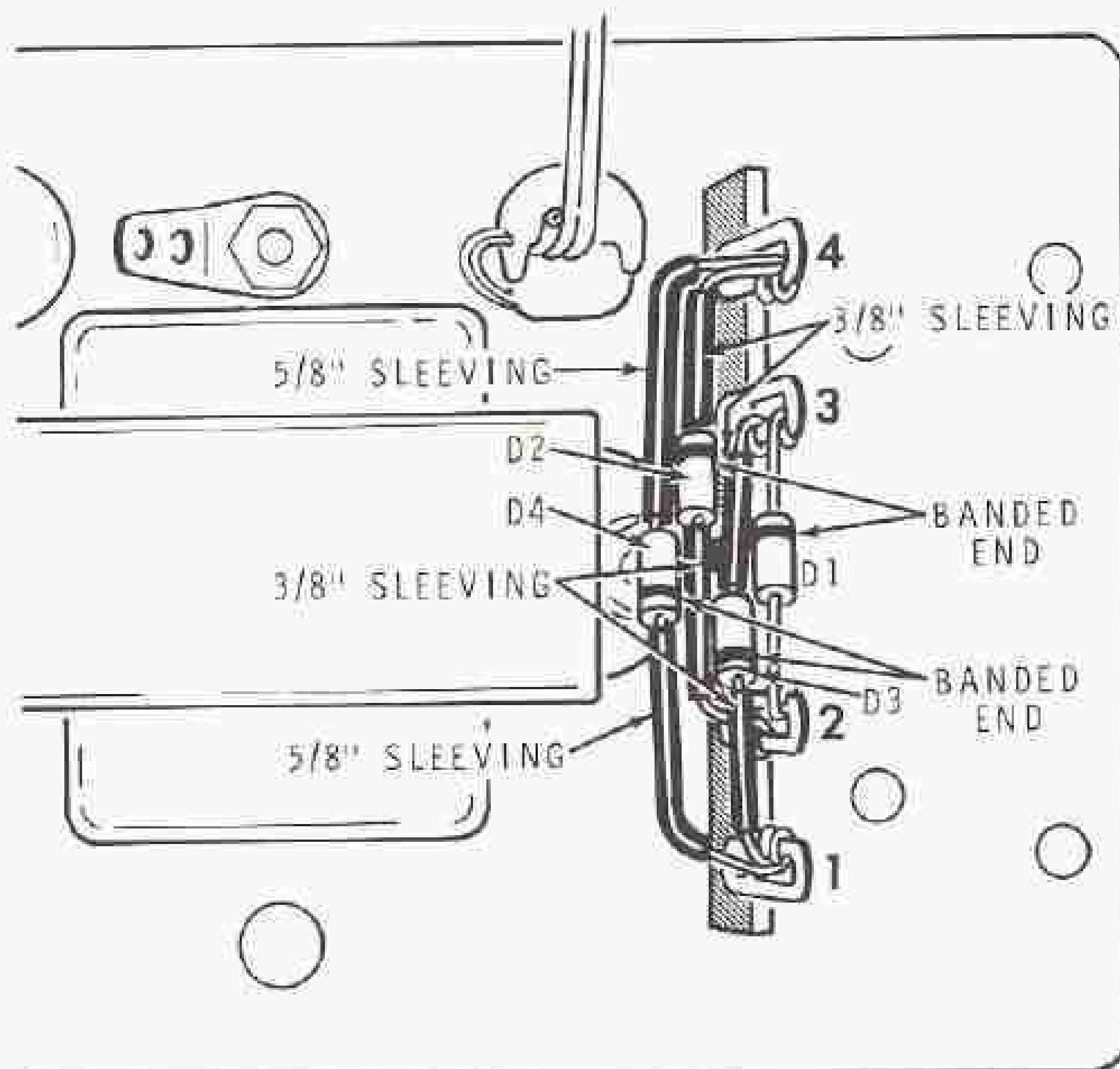
Detail 2B



Detail 2C

- (X) T1: Mount the transformer as follows:
 - Use a 6-32 × 3/8" black screw, two #6 lockwashers, a 3-lug terminal strip, and a 6-32 nut at hole E as shown. See Detail 2C.
 - In a similar manner, use a 6-32 × 3/8" black screw, two #6 lockwashers, a 4-lug terminal strip, and a 6-32 nut at hole A.
- (X) Refer to Detail 2D (Illustration Booklet, Page 2) and prepare the end of the DC cable as shown.
- (X) Refer to Detail 2E (Illustration Booklet, Page 2) and install the DC cable at B with a small strain relief.
- (X) Refer to Detail 2F and prepare the end of the line cord as shown.
- (X) In the same manner as before, install the line cord at D with a large strain relief. However, this strain relief must be rotated 90° (1/4 turn) before you insert it.





Detail 3A

Refer to Pictorial 3 (Illustration Booklet, Page 3) for the following steps.

In the following four steps, you will mount 1N4002 diodes (57-65) to terminal strip A. When you mount a diode:

- Be sure to position its banded end as shown.
- Be sure to position it on the transformer side of the terminal strip, and do not let its leads touch other diode leads or metal objects.

NOTE: In the following steps, (NS) means not to solder because other wires will be added later. (S-) with a number, such as (S-3) means to solder the connection. The number following the "S" tells how many wires are at the connection.

Refer to Detail 3A for the next four steps.

- () D1: Connect the lead at the banded end to lug 3 (NS). Connect the other lead to lug 2 (NS).

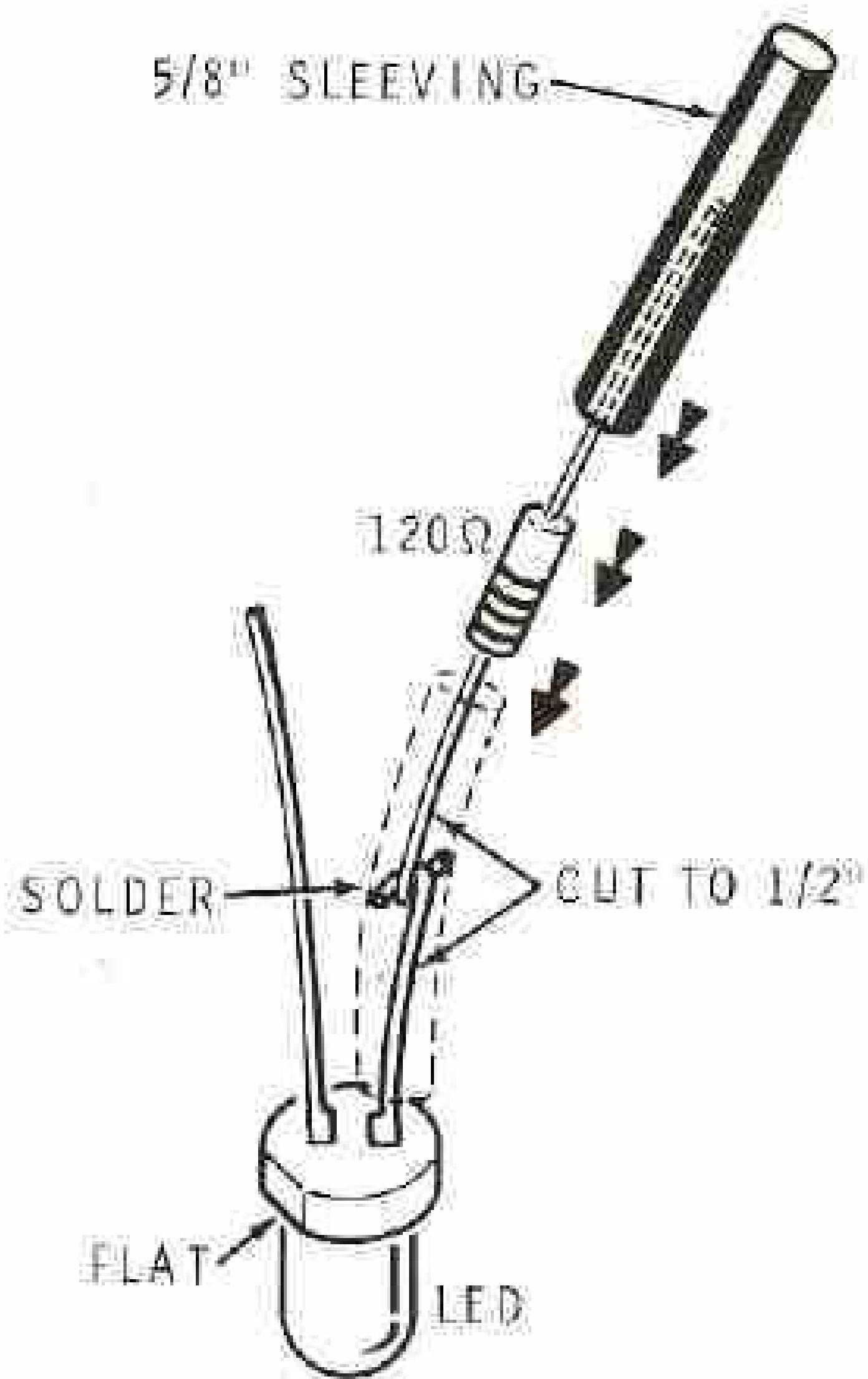
NOTE: In the following steps when you are instructed to use sleeving, cut the sleeving to the proper length and install it on the indicated diode lead.

- () D2: Use a 3/8" length of sleeving on each lead. Connect the lead at the banded end to lug 4 (NS). Connect the other lead to lug 2 (NS).
- () D4: Use a 5/8" length of sleeving on each lead. Connect the lead at the banded end to lug 1 (NS). Connect the other lead to lug 4 (NS).
- () D3: Use a 3/8" length of sleeving on each lead. Connect the lead at the banded end to lug 1 (NS). Connect the other lead to lug 3 (NS).
- () Connect either red transformer lead to terminal strip A lug 3 (S-3).
- () Connect the remaining red transformer lead to terminal strip A lug 4 (S-3). Then position the two wires neatly down near the cover plate.
- () Connect the center wire of cable B to terminal strip A lug 2 (NS).
- () Connect the remaining long wire of cable B to terminal strip E lug 1 (NS).

In some of the following steps, you will be instructed to "make mechanically secure connections." To do this, insert and wrap the wire end around the lug; then crimp the wire to the lug. See inset drawing #1.

- () Connect the green wire of line cord D to solder lug C (S-1). Make a mechanically secure connection.
- () Refer to inset drawing #2 and identify the ribbed wire of the line cord. Connect this wire to terminal strip E lug 2 (NS). Make a mechanically secure connection.
- () Connect the remaining line cord wire to terminal strip E lug 3 (NS). Make a mechanically secure connection.
- () Connect either black transformer lead to terminal strip E lug 2 (S-2). Make a mechanically secure connection.
- () Connect the remaining black transformer lead to terminal strip E lug 3 (S-2). Make a mechanically secure connection.



**Detail 3B**

Refer to Detail 3B for the following steps.

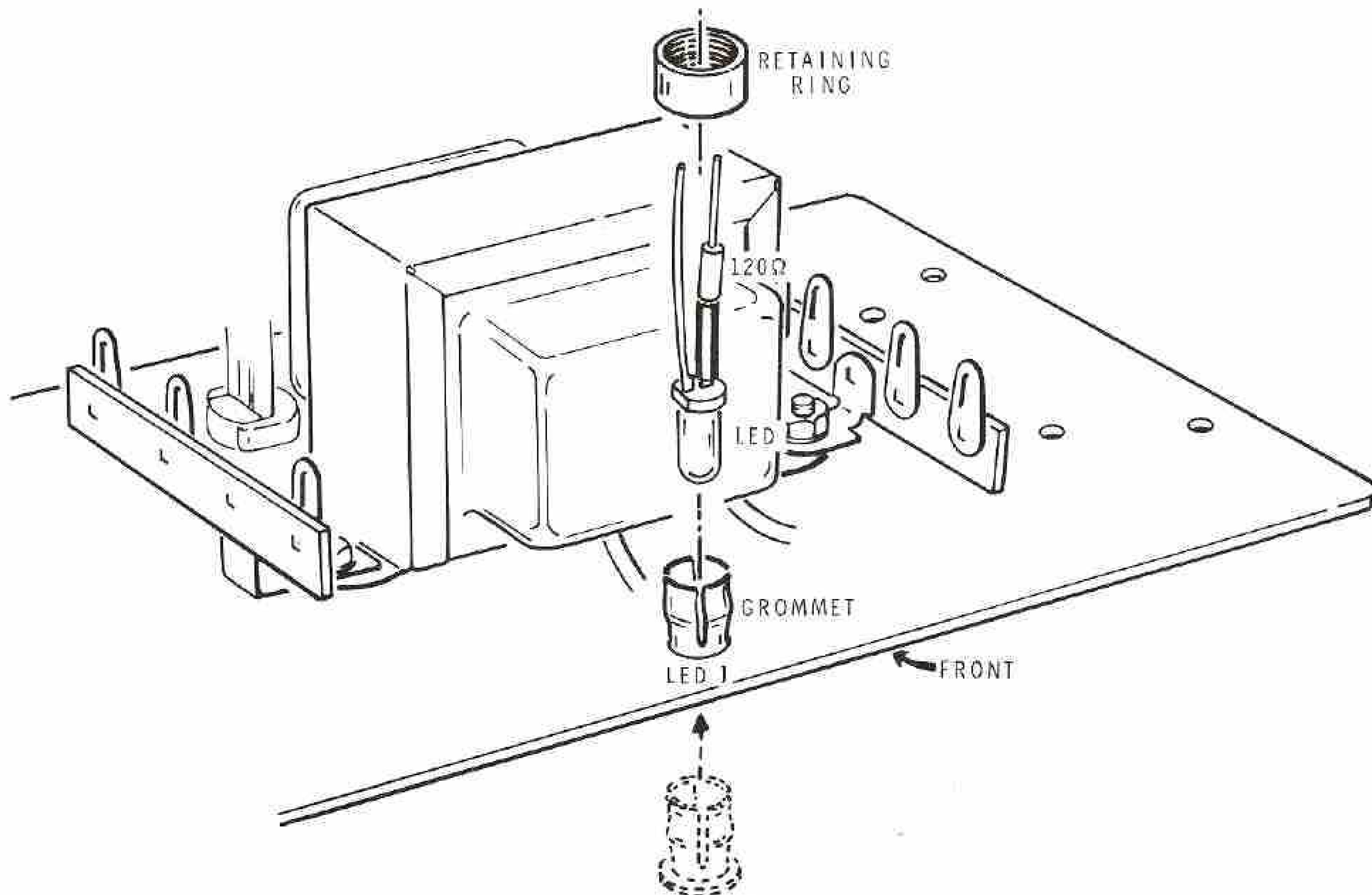
- () LED1: Cut the lead farthest from the flat of the LED (#412-611) to 1/2".
- () R1: Cut both leads of the 120 Ω , 1/4-watt (brown-red-brown) resistor to 1/2".

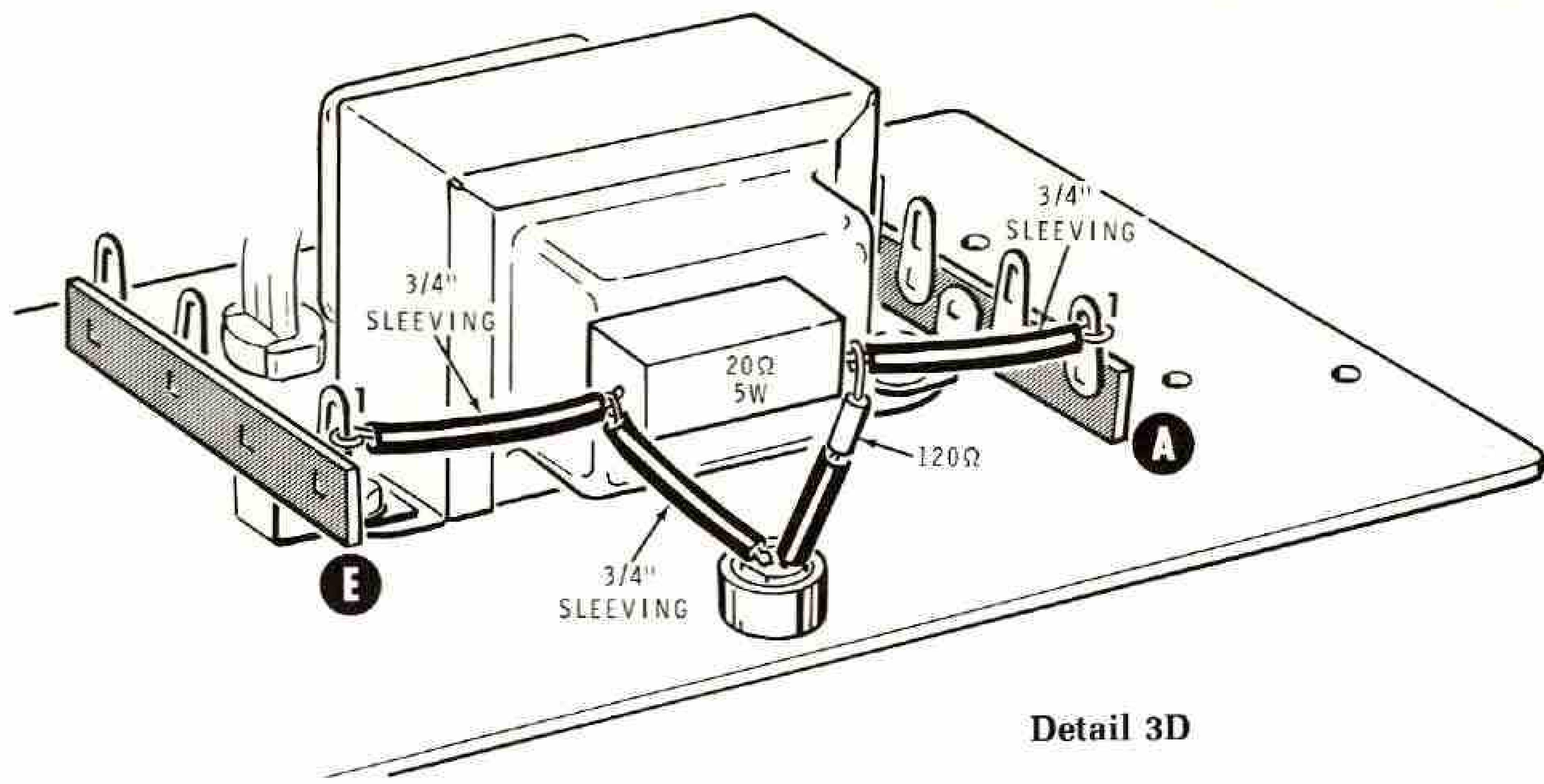
() Connect either lead of the prepared resistor to the shorter lead of the LED (S-1). Use a small amount of solder.

() Cut a 5/8" length of sleeving and slide it over the resistor LED combination.

() Refer to Detail 3C and install the LED as follows:

1. Install the grommet in the cover plate at LED 1.
2. Push the LED into the grommet. Be sure the 120 Ω resistor is positioned as shown. The LED should protrude out the front approximately 1/8".
3. Slide the retaining ring down over the grommet.

**Detail 3C**



Refer to Detail 3D for the following steps.

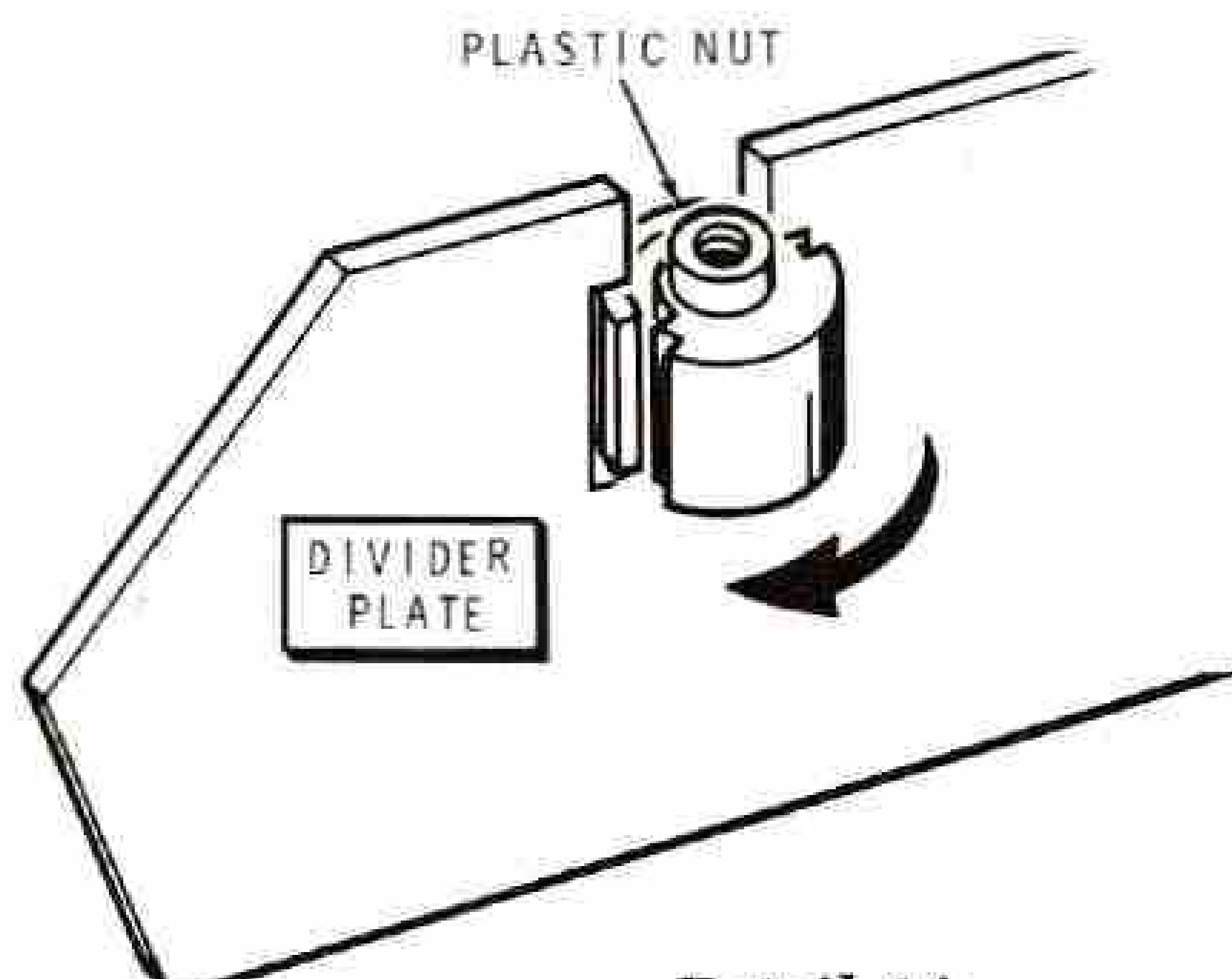
- () Cut a 3/4" length of sleeving and slide it over the free end of the LED.
- () R2: Wrap the free leads of the resistor and LED around the leads of the 20Ω, 5-watt resistor. Solder the connections and cut off the excess lead lengths as shown. Do not cut the leads of the 20 Ω resistor.
- () Cut two 3/4" lengths of sleeving and slide them over the leads of the 20 Ω resistor.
- () Connect the lead of the 20 Ω resistor that also has the 120Ω resistor connected to it to terminal strip A lug 1 (S-3). (Do not bend the LED leads too much; they could break.)
- () Connect the other resistor lead to terminal strip E lug 1 (NS). Position the 20 Ω resistor up against the transformer.
- () Refer again to Detail 3A and recheck the diodes to be sure their bands are positioned properly and their leads are not touching together.

Refer to Pictorial 4 for the following steps.

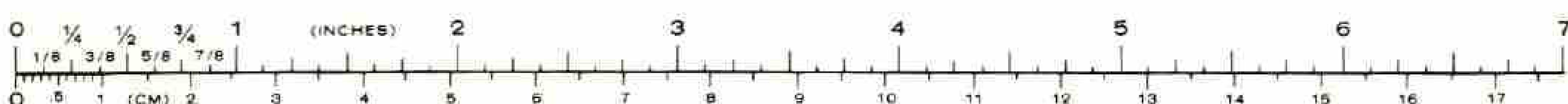
- () Refer to Detail 4A and install two plastic nuts in the divider plate.
- () Mount the divider plate to the cover plate with two 6-32 × 3/8" black screws. Do not overtighten the screws. Position the divider plate as shown.
- () Position the battery holder assembly near terminal strip A and connect its wires:

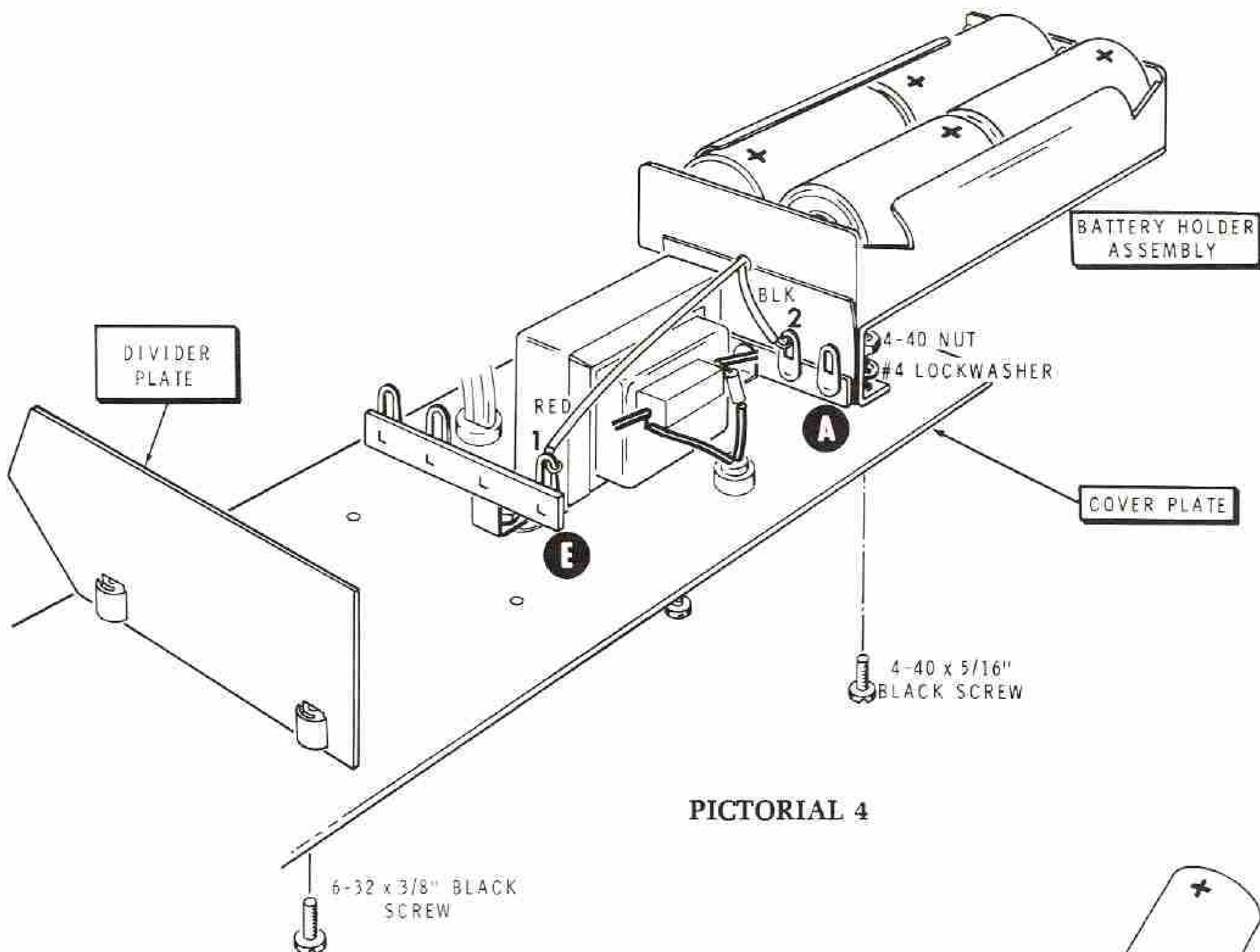
Black wire to terminal strip A lug 2 (S-4).

Red wire to terminal strip E lug 1 (S-3).



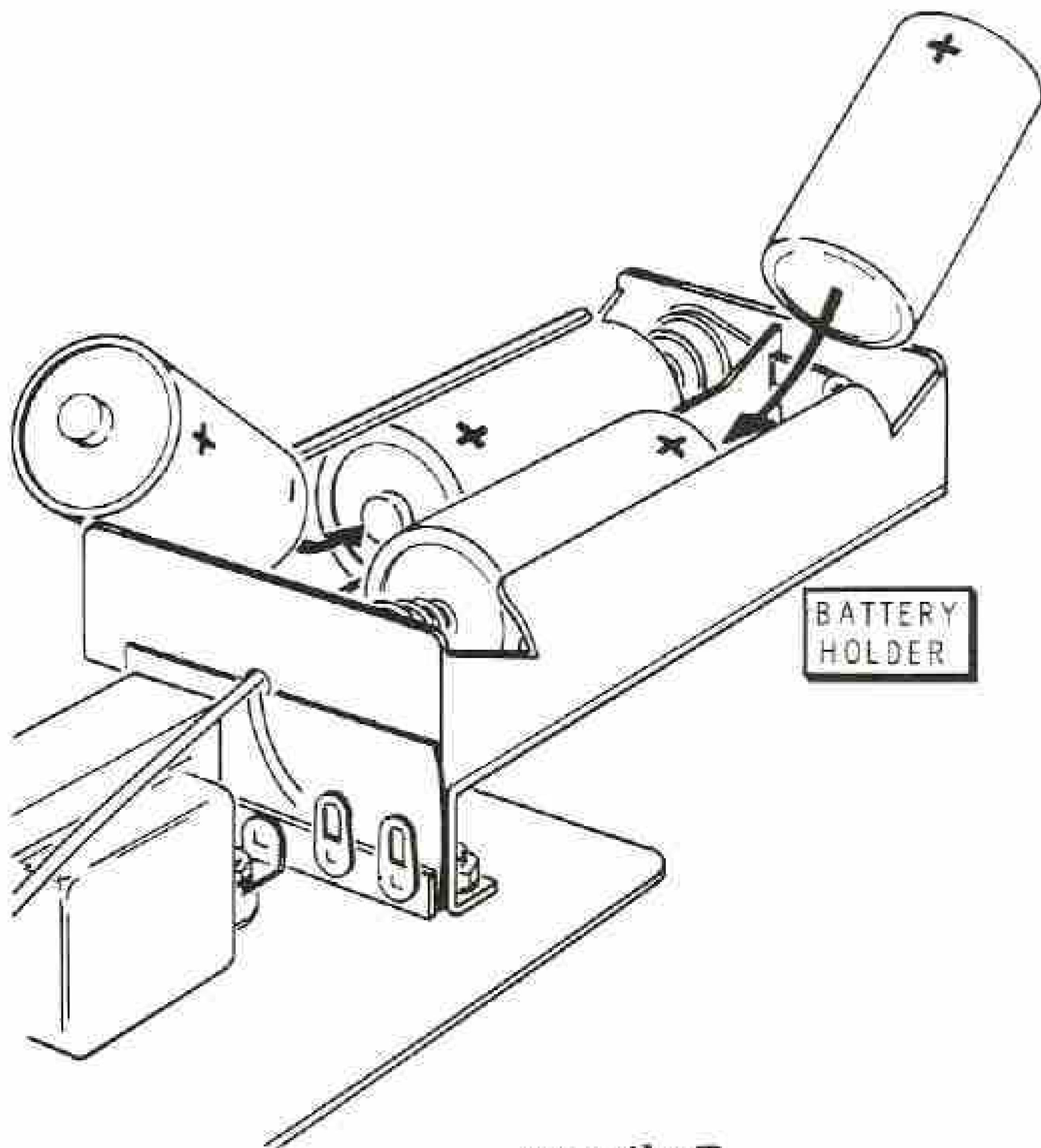
Detail 4A





- () Mount the battery holder assembly to the cover plate as shown. Use two 4-40 × 5/16" black screws, two #4 lockwashers, and two 4-40 nuts. Carefully, bend terminal strip A toward the transformer slightly if necessary.
- () Refer to Detail 4B and install the four batteries into the battery holder.

This completes the wiring of your kit. Check to see that all connections are soldered and that none of the fine wires are touching any other lug or the transformer.



INITIAL TESTS

If you have an ohmmeter, perform the following four steps. If you do not have an ohmmeter, disregard the four steps.

Refer to Pictorial 5 for the following steps.

- () Set your ohmmeter on the R \times 10 scale.
- () Connect the ohmmeter common (negative) lead to solder lug C. Then touch the other lead to first lug 2 and then lug 3 of terminal strip E. The indications should be infinity. If not, recheck the wiring.
- () Connect the ohmmeter common lead to terminal strip E lug 2 and the other lead to lug 3 of the terminal strip. The indication should be from 100 to 300 ohms. If not, recheck the wiring.

- () Disconnect the ohmmeter and set it aside.

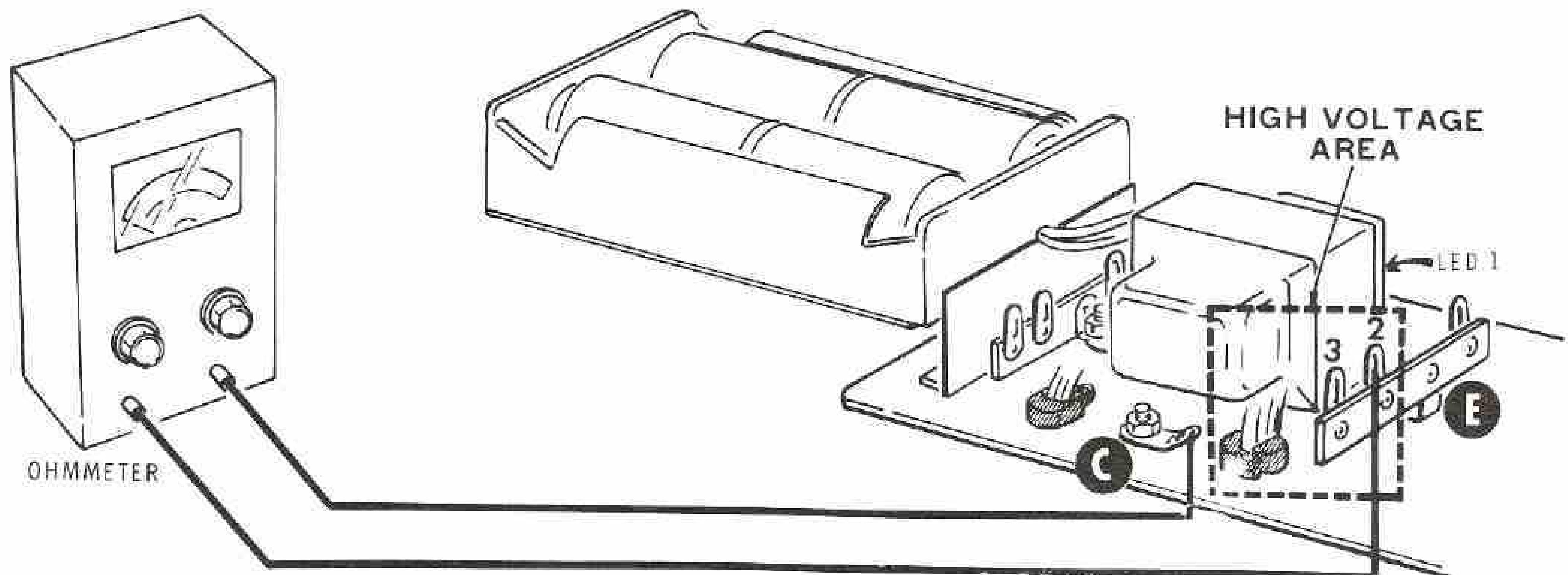
NOTE: If you do not obtain the proper results in the next step, immediately, unplug the line cord and proceed to "In Case Of Difficulty" on Page 13.

WARNING: When the line cord is connected to an AC outlet, line voltage is present at terminal strip E lugs 2 and 3. Be careful that you do not contact this voltage or an electrical shock will result. See Pictorial 5.

- () Plug the line cord into an AC outlet. LED1 should light.

- () Unplug the line cord.

Proceed to "Final Assembly."



PICTORIAL 5





FINAL ASSEMBLY

Refer to Pictorial 6 (Illustration Booklet, Page 3) for the following steps.

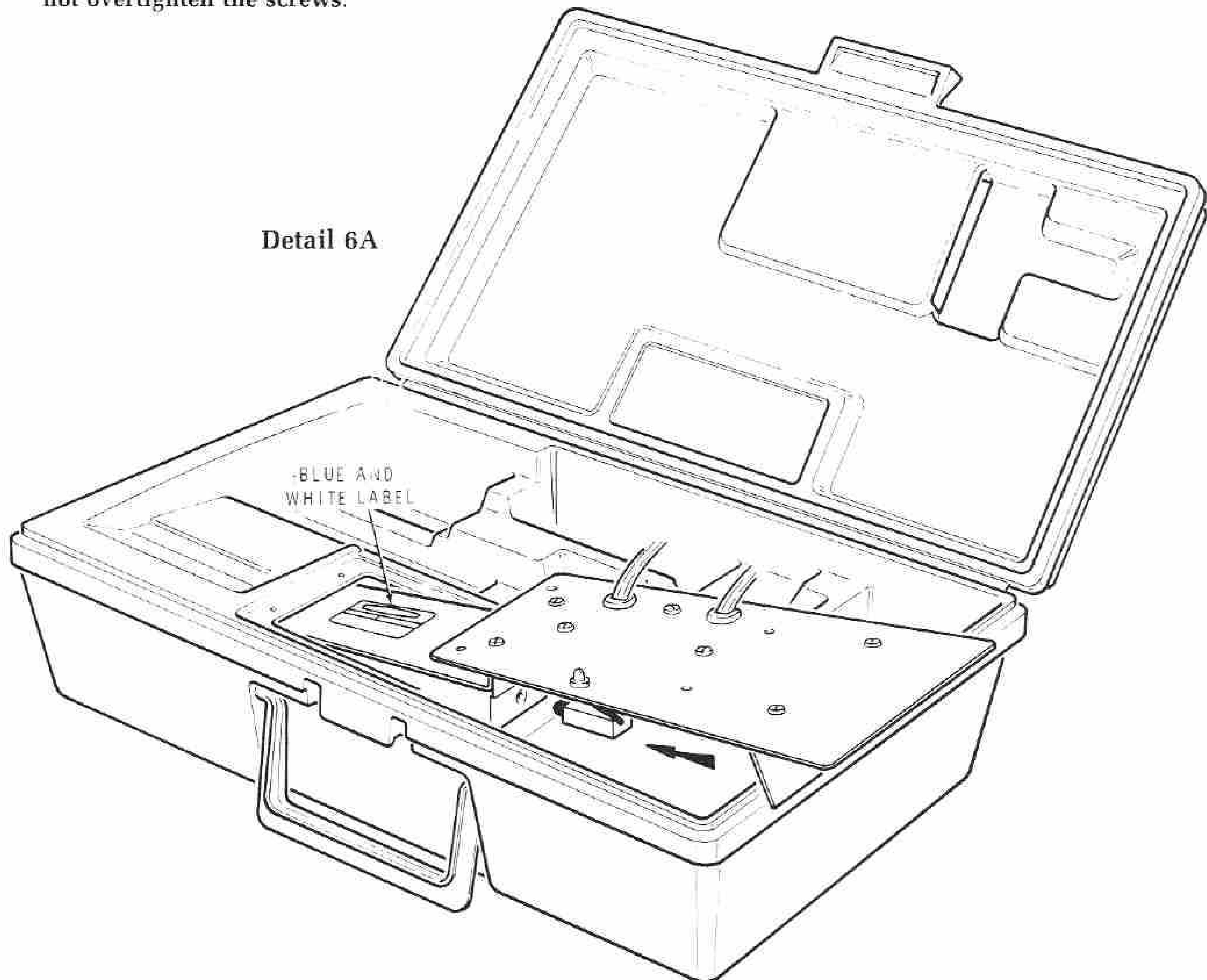
- () Refer to Detail 6A, remove the protective backing from the blue and white label, and press the label into position as shown. Always mention the numbers on this label in any communications you have with the Heath Company about this kit.
- () Remove any loose shavings from inside the cabinet cutouts.
- () Again refer to Detail 6A, slide the assembly into the cabinet, and secure it in place with four #6 \times 3/8" black sheet metal screws. Be sure that no wires are pinched under the cover plate and **do not overtighten the screws**.

() Remove the protective backing from the foam tape and press the tape into place at G as shown. Be sure it is centered in the mounting area.

() Remove the power label from the label set and install it in the cabinet top as shown.

() Refer to the inset drawing and install the model label on the outside of the cabinet top.

This completes the assembly of your kit.

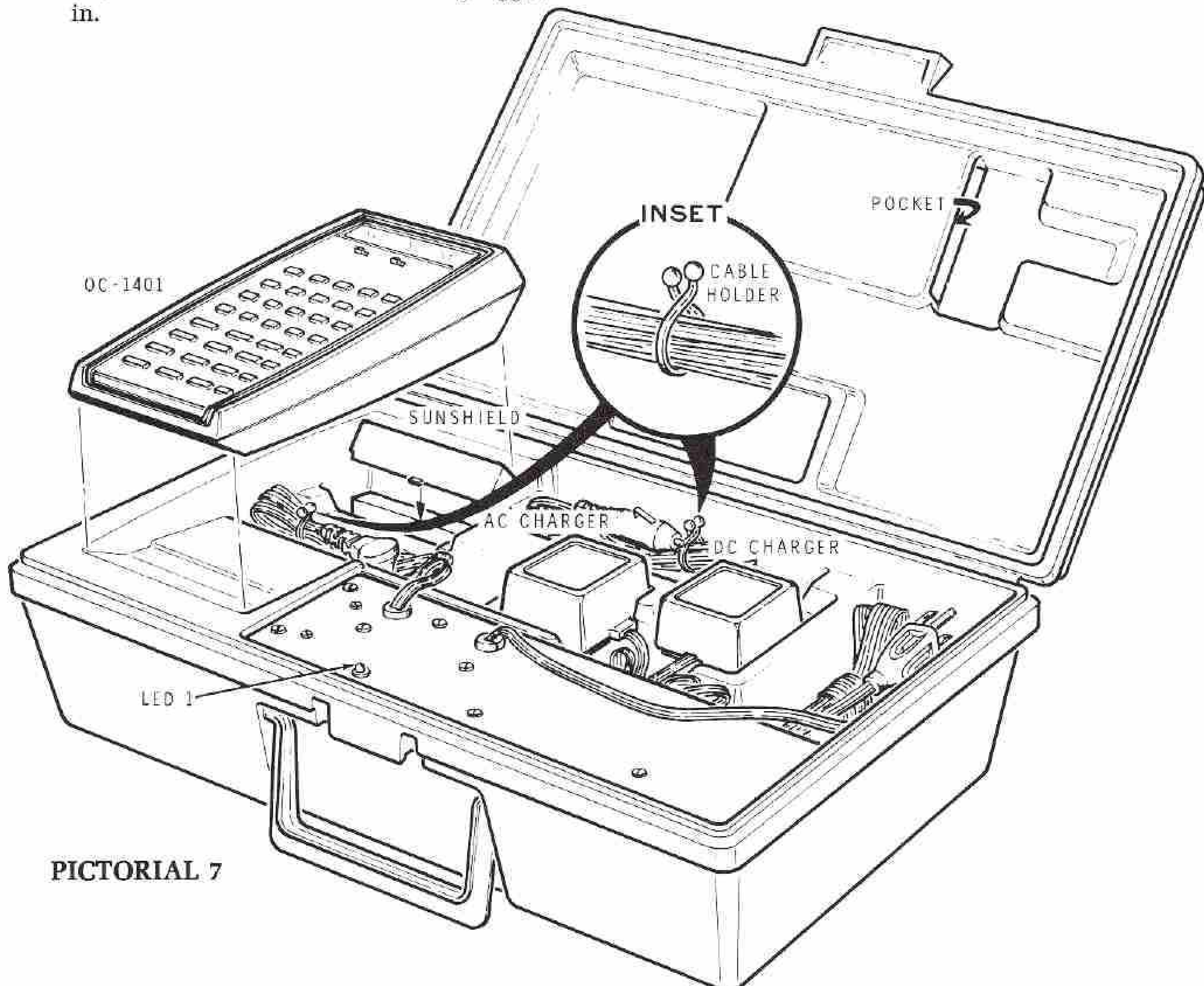




OPERATION

Your carrying case was designed to hold your computer and its accessories as shown in Pictorial 7.

- The sun shield is held in place by pushing it down over the foam tape.
- The pocket in the top is for the Computer Operation Guide.
- When you are charging your carrying case batteries, do not have your Computer connected to the DC cable.
- LED1 indicates when batteries are being charged. It is a power indicator and is always on whenever the line cord is plugged in.
- Use the cable holders as shown in the inset drawing in Pictorial 7. You may also wish to use rubber bands to hold the line cord and other cables.
- The "AA" cells in your Computer are not charged during operation from the Carrying Case.
- The charging circuit is not to be used to charge any cells except the "C" cells in the Carrying Case.





IN CASE OF DIFFICULTY

The following paragraphs deal with the types of difficulties that may show up right after the kit is assembled, before you can put it into operation. These difficulties are most likely to be caused by assembly errors or faulty soldering.

The following checks will help you locate any error of this type that might have been made.

1. Recheck the wiring. Trace each lead in colored pencil on the Pictorial as it is checked. It is frequently helpful to have a friend check your work. Someone who is not familiar with the unit may notice something consistently overlooked by the builder.
2. About 90% of the kits that are returned for repair, do not function properly due to poor con-

nnections and soldering. Therefore, many troubles can be eliminated by reheating all connections to make sure that they are soldered.

3. Check for bits of solder, wire ends, or other foreign matter which may be lodged in the wiring.

NOTE: In an extreme case where you are unable to resolve a difficulty, refer to the "Customer Service" information inside the back cover of the Manual. Your Warranty is inside the front cover.

WARNING: When the line cord is connected to an AC outlet, live voltage is present at terminal strip E lugs 2 and 3. Be careful that you do not contact this voltage or an electrical shock will result. See Pictorial 5.

Troubleshooting Chart

PROBLEM	POSSIBLE CAUSE
LED1 does not light.	<ol style="list-style-type: none"> 1. Check the AC outlet. Plug a lamp into it to be sure it is OK. 2. Recheck the diodes for the correct positions of the banded ends. 3. Recheck the transformer wiring. 4. Check the battery connections and their installation.



YT-1 SPECIFICATIONS

Battery Life	Approximately six hours with the Computer's display lit.
Charge Time	15 hours from no charge to full charge.
Power Consumption	Approximately four watts. 100-135 volts, 50-60 Hz.
Dimensions	12-1/4" W × 8" D × 3-1/8" H
Weight	Empty: 3 Lbs. Full: 4 Lbs.

The Heath Company reserves the right to discontinue products and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.



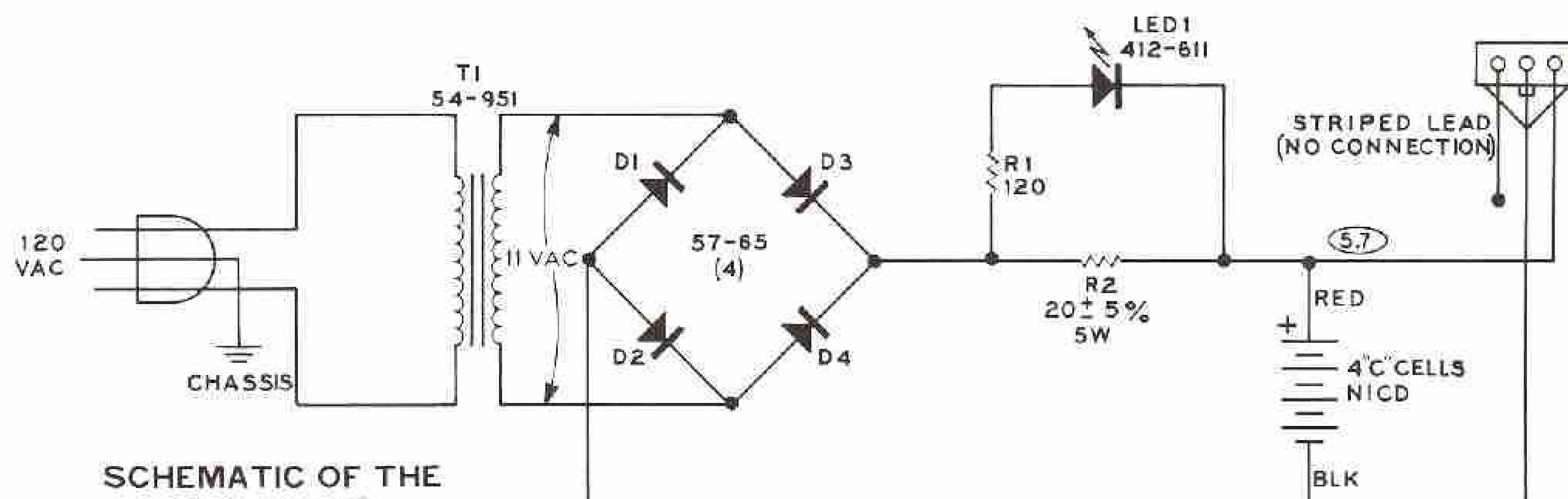
CIRCUIT DESCRIPTION

Refer to the Schematic while you read the following information.

When the line cord is connected to an AC outlet, transformer T1 steps down the line voltage. Diodes D1 through D4 rectify the current and resistor R2 limits this current to approximately 200 milliam-

peres. Resistor R1 and LED1 sense current flowing and, therefore, LED1 indicates when batteries are charging.

When the Computer is plugged into the Carrying Case cable, the batteries in the Computer are disabled and the carrying case batteries power the Computer.



SCHEMATIC OF THE
HEATHKIT®
CARRYING CASE
MODEL OCA-1401-1

ADDITIONAL NOTES

and how it inhibits some polymerization processes, and how it may be used to advantage.

It is also interesting to note that the addition of a small amount of Fe^{2+} to the polymerization system will reduce the rate of polymerization.

The authors wish to thank Dr. J. C. G. de Groot for his help in the preparation of the samples used in this work.

This research was supported by grants from the National Research Council of Canada and the Ontario Research Foundation.

One of us (A. S. M.) wishes to thank the Ministry of Education of Ontario for a scholarship.

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CUSTOMER SERVICE

REPLACEMENT PARTS

Please provide complete information when you request replacements from either the factory or Heath Electronic Centers. Be certain to include the **HEATH** part number exactly as it appears in the parts list.

ORDERING FROM THE FACTORY

Print all of the information requested on the parts order form furnished with this product and mail it to Heath. For telephone orders (parts only) dial 616 982-3571. If you are unable to locate an order form, write us a letter or card including:

- Heath part number.
- Model number.
- Date of purchase.
- Location purchased or invoice number.
- Nature of the defect.
- Your payment or authorization for COD shipment of parts not covered by warranty.

Mail letters to: Heath Company
Benton Harbor
MI 49022
Attn: Parts Replacement

Retain original parts until you receive replacements. Parts that should be returned to the factory will be listed on your packing slip.

OBTAINING REPLACEMENTS FROM HEATH ELECTRONIC CENTERS

For your convenience, "over the counter" replacement parts are available from the Heath Electronic Centers listed in your catalog. Be sure to bring in the original part and purchase invoice when you request a warranty replacement from a Heath Electronic Center.

TECHNICAL CONSULTATION

Need help with your kit? — Self-Service? — Construction? — Operation? — Call or write for assistance. You'll find our Technical Consultants eager to help with just about any technical problem except "customizing" for unique applications.

The effectiveness of our consultation service depends on the information you furnish. Be sure to tell us:

- The Model number and Series number from the blue and white label.
- The date of purchase.
- An exact description of the difficulty.
- Everything you have done in attempting to correct the problem.

Also include switch positions, connections to other units, operating procedures, voltage readings, and any other information you think might be helpful.

Please do not send parts for testing, unless this is specifically requested by our Consultants.

Hints: Telephone traffic is lightest at midweek — please be sure your Manual and notes are on hand when you call.

Heathkit Electronic Center facilities are also available for telephone or "walk-in" personal assistance.

REPAIR SERVICE

Service facilities are available, if they are needed, to repair your completed kit. (Kits that have been modified, soldered with paste flux or acid core solder, cannot be accepted for repair.)

If it is convenient, personally deliver your kit to a Heathkit Electronic Center. For warranty parts replacement, supply a copy of the invoice or sales slip.

If you prefer to ship your kit to the factory, attach a letter containing the following information directly to the unit:

- Your name and address.
- Date of purchase and invoice number.
- Copies of all correspondence relevant to the service of the kit.
- A brief description of the difficulty.
- Authorization to return your kit COD for the service and shipping charges. (This will reduce the possibility of delay.)

Check the equipment to see that all screws and parts are secured. (Do not include any wooden cabinets or color television picture tubes, as these are easily damaged in shipment. Do not include the kit Manual.) Place the equipment in a strong carton with at least THREE INCHES of resilient packing material (shredded paper, excelsior, etc.) on all sides. Use additional packing material where there are protrusions (control sticks, large knobs, etc.). If the unit weighs over 15 lbs., place this carton in another one with 3/4" of packing material between the two.

Seal the carton with reinforced gummed tape, tie it with a strong cord, and mark it "Fragile" on at least two sides. Remember, the carrier will not accept liability for shipping damage if the unit is insufficiently packed. Ship by prepaid express, United Parcel Service, or insured Parcel Post to:

Heath Company
Service Department
Benton Harbor, Michigan 49022

HEATH
Schlumberger

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THE WORLD'S FINEST ELECTRONIC EQUIPMENT IN KIT FORM

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